

App. No. 10/707,104
Amendment dated March 15, 2006
Reply to Office action of December 15, 2005

REMARKS

Summary of Amendments

Independent claims 1, 7 and 13 have been amended to more particularly point out and distinctly claim the inventive features that Applicant previously argued patentably distinguish the present invention over the prior art of record.

In addition, claims 5 and 6, which depend from claim 1, and claims 11 and 12, which depend from claim 7, have been amended to accord with the amendments to their respective base claims.

It is respectfully submitted that the present amendments raise no issues that have not already been before the Examiner for his consideration in the course of the prosecution to date. In particular, merely functional language regarding fan airflow, previously recited in the recitation of the claimed guard plate, has been shifted to where it belongs—tied in with the structure of the impeller blade unit. And although the term "airflow vector" was not previously in the claims, the term finds support, as noted below, in the specification, and has been incorporated into the amended independent claims simply to render them more precise and clear.

Namely, apart from editorial changes, the substantive changes to claim 1 (which are paralleled in claims 7 and 13) are indicated by the numbered underlined phrases in the clean version below.

1. A cooling fan motor comprising:
a rotor including a magnet and (i) defining a rotational axis;
an impeller blade unit coaxially fixed to the rotor and (ii)
configured to generate a spiral airflow defining an airflow vector
inclined at a predetermined angle to the rotational axis;
a stator disposed facing the rotor magnet;
a frame constituting an outer frame of the fan motor, for retaining the stator; and
a guard plate covering an outer surface of the frame and either fixed to or formed integrally with the frame, the guard plate including intersecting ribs extending in at least two directions, the intersections of the ribs being fixed to each other and therein forming a mesh grid, and each of the ribs, in cross section orthogonal to the rib lengthwise, having at least (iii) one side inclined at substantially the same angle as said airflow vector.

Amendment (i) is inherent to rotors; amendment (ii) is a clarification of the phrase "an airflow spirally that is generated . . . due to the rotation of the impeller blade unit," by

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shifting the content of this phrase from the recitation of the guard plate to the recitation of the impeller blade unit; and amendment (iii) is a clarification of the phrase, "the inclined side [of the ribs] is substantially parallel to the direction of an airflow."

Support for Amendments

For the recitation of an "airflow vector" in claims 1, 7 and 13, support is found in the specification as filed, in paragraph [0045], for example, and in Fig. 3 to which paragraph [0045] refers. Paragraph [0045] notes

a direction of the airflow generated by one blade becomes inclined from the axis direction, in which a component in the rotation direction of the impeller 17 is added to a component in the axis direction.

Since the result of adding two directional components is by definition a vector, adding the airflow rotational and axial components as stated in the above-quoted passage from paragraph [0045] must result in an airflow vector—i.e., "arrow" F2 as illustrated in Fig. 3 (and in Figs. 5A and 5B as well).

Rejections under 35 U.S.C. § 103

Claims 1-3 and 5; Maruyama et al. '271 in view of Branson '460

Claims 1-3, and 5 have again been rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 4,603,271 to Maruyama et al., in view of U.S. Pat. No. 1,313,460 to Branson.

As explained in Applicant's remarks of October 24, 2005 in reply to the first Office action on the merits in the instant case, features of a fan motor of the present invention lie in: (1) not sacrificing the performance of a finger guard in the form of a mesh of intersecting ribs; and (2) airflow across the finger guard is made to flow more easily, while the fan efficiency and cooling efficiency are enhanced.

With regard to (2) above, a cooling fan motor of the present invention comprises an impeller blade unit "configured to generate a spiral airflow defining an airflow vector inclined at a predetermined angle to the rotational axis," and a finger guard each of whose constituent ribs is provided with a surface that is "inclined at substantially the same angle as said airflow vector," as now recited in the amended independent claims.

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Branson discloses intersecting bars in a face-plate for covering air-registers and ventilators, with each of the bars "being triangular in cross section and having continuous rearwardly tapering sides terminating in sharp edges presented to the air current to present the minimum of obstruction to the air current" (from claim 1 of the Branson patent). Nevertheless, Branson neither teaches nor suggests finger-guard ribs provided with a surface that is "inclined at substantially the same angle as [the] airflow vector," defined by the airflow from an impeller blade unit "configured to generate a spiral airflow . . . inclined at a predetermined angle to the rotational axis."

What this configurational condition on the form of a meshwork finger guard according to the present invention means specifically is explained in paragraphs [0037] and [0038] of the specification, with reference to Fig. 4:

[T]he inclined surface 5c of the first rib group 51 that is positioned at the left side of the rib 52b *faces down* in FIG. 4. Similarly, the inclined surface 5c of the first rib group 51 that is positioned at the right side of the rib 52b *faces up* in FIG. 4.

[T]he inclined surface 5c of the second rib group 52 that is positioned at the upper side of the line *faces left*. In the same way, the inclined surface 5c of the second rib group 52 that is positioned at the lower side of the line L in FIG. 4 *faces right*.

(Emphasis added.) In other words, the angling of the ribs constituting the finger guard illustrated in Fig. 4 results in a meshwork configuration that approximates a spiral—like a loop of toppled dominoes—because "each of the ribs, in cross section orthogonal to the rib lengthwise, ha[s] at least one side inclined at substantially the same angle as said airflow vector," as now set forth in the independent claims.

Similarly, the embodiments of the present invention depicted in Figs. 8, 10 and 11 include finger-guard meshwork configurations in which the angling of the meshwork ribs is still closer to that of the vector defined by the spiral airflow coming from the impeller blade unit.

The Maruyama et al. patent—while admittedly being analogous prior art as asserted under the "Response to Arguments" section of the Office action—does not disclose a finger-guard meshwork configuration in the manner of the present invention as now recited in the independent claims. The Office action asserts that in Maruyama et al., the fixed blades 4 (ribs) within the fan base opening are substantially parallel to the airflow direction, indicated by arrow *a* in Figs. 3 and 7. While the figures and the patent itself do not indicate that the fixed blades are even roughly parallel to the airflow direction, the figures and description do make clear that the air stream direction *a* is axially straight out of the fan, and that, as stated in column 3, lines 22-24, "by the existence of the fixed blades 4 and 9 the airflow could

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be increased." Accordingly, Maruyama et al. neither discloses nor suggests whatsoever the technical concepts to resolve the above-noted (1) and (2) in a meshwork finger guard.

As the Examiner points out, Branson does disclose a guard plate ("face-plate") in a meshwork of ribs with inclined sides. Nevertheless, no disclosure is made therein as to whether the direction in which the airflow travels is posited. At least, because the inclined sides of the ribs in Branson all head in the same orientation, it is clear that the rib orientation is not optimal for a spiral airflow. In particular, while a Branson meshwork configuration would include some ribs with inclined sides parallel to the airflow, apart from those, the rest of the meshwork would include orthogonal inclined sides or sides at other angles to the airflow—ribs with inclined sides optimally oriented to a spiral airflow would not as a whole constitute the meshwork.

Consequently, even applying the Branson face-plate to the teachings of Maruyama et al. could not yield the present-invention configuration and its advantages.

Claim 4: Maruyama et al. '271 as modified by Branson '460, further in view of McAnally et al. '566

Claim 4 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Maruyama et al. as modified by Branson, referenced and discussed above, further in view of U.S. Pat. No. 5,788,566 to McAnally et al.

Because claim 4 depends from an independent claim 1 that for the above-mentioned reasons is believed to be allowable, it is respectfully submitted that the rejection of these claims by extension over McAnally et al. has been rendered moot.

Claim 6: Maruyama et al. '271 as modified by Branson '460, further in view of Price '534

Claim 6 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Maruyama et al. as modified by Branson, referenced and discussed above, further in view of U.S. Pat. No. 3,481,534 to Price.

Because claim 6 depends from an independent claim 1 that for the above-mentioned reasons is believed to be allowable, it is respectfully submitted that the rejection of these claims by extension over Price has been rendered moot.

Nevertheless, Applicants wish to point out distinctions between the Price disclosure and the present invention. A configuration of ribs that are rectangular in cross-section is disclosed in the Price patent. Although the Office alleges a correspondence between the Price configuration and that of Fig. 5(B) of the present

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invention, the rib inclined sides of Price are not oriented at a pitch parallel to the spiral airflow, and thus differ from the present invention.

In particular, Price actually teaches the complete opposite of the technical problem that the present invention addresses. Namely, Price teaches taking advantage of the "spiral of rotational effect" to the air discharge stream from an axial-flow fan, by utilizing "a component of rotational force . . . to rotate a deflector which may be positioned in front of the fan" (column 1, lines 30-35).

Thus, despite the assertion in the Office action that Price in Figs. 1-5 "teaches a fan guard plate 17 having a plurality of ribs 46" whose cross-sectional shape is a rectangle the two longer sides of which "are both parallel to the direction" of the airflow from the fan, the Price deflector 17, alleged in the Office action to be a "guard plate," is *rotatable*; in fact, the vanes in the deflector 17 are configured to "include at least one vane against which air discharge by the fan acts to exert a component of force for rotating the deflector member" (claim 1 in Price). In contrast, a guard plate in the present invention is "either fixed to or formed integrally with the frame" as recited in the independent claims.

Claim 7-11 and 13; McAnally et al. '566 in view of Maruyama et al. '271, further in view of Branson '460

Claim 12; McAnally et al. '566 as modified by Maruyama et al. '271 as modified by Branson '460, and in view of Price '534

Claims 7-11 and 13 were rejected under 35 U.S.C. 103(a) as being unpatentable over McAnally et al. in view of Maruyama et al., and further in view of Branson, each of which patents has been referenced and discussed above.

Claim 12 was rejected under 35 U.S.C. 103(a) as being unpatentable over McAnally et al. as modified by Maruyama et al. as modified by Branson, and in view of Price, each of which patents has been referenced and discussed above.

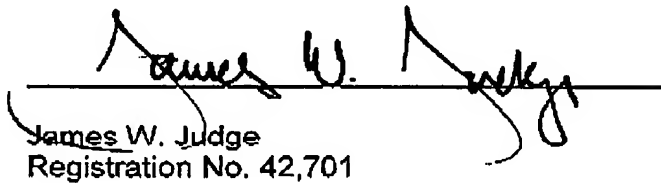
Independent claim 7 is directed to, and independent claim 13 includes, a case provided with, as a guard plate, a finger guard as recited in claim 1. Claims 7 and 13 have been amended in the same manner that claim 1 has been amended, and thus for the foregoing reasons presented in discussing the rejections of claim 1, should be allowable over the prior art or record, as should claims 8-12, which depend from claim 7.

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Accordingly, Applicant courteously urges that this application is in condition for allowance. Reconsideration and withdrawal of the rejections is requested. Favorable action by the Examiner at an early date is solicited.

Respectfully submitted,

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